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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/593,899

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Michael J. Hollins

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EXAMINER

VETERE, ROBERT A

ART UNIT

PAPER NUMBER

1712

MAIL DATE

DELIVERY MODE

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/593,899	<b>Applicant(s)</b> HOLLINS ET AL.	
	<b>Examiner</b> ROBERT VETERE	<b>Art Unit</b> 1712	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 03 June 2011.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 5-11, 13-20 and 23-27 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 5-11, 13-20 and 23-27 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>10/06; 10/06</u>  | 6) <input type="checkbox"/> Other: _____                          |

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## DETAILED ACTION

### *Election/Restrictions*

1. Claims 1-4, 21 and 22 have been withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 6/3/11.

### *Claim Rejections - 35 USC § 102*

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 6-8, 11, 13 and 23-25 are rejected under 35 U.S.C. 102(b) as being anticipated by Breslin (US 5,214,011).

**Claims 6, 8, 11 and 23:** Breslin teaches a method of reducing titanium metal from its oxide comprising the steps: providing a permeable matrix comprising titanium oxide (2:65-3:32), providing an alloy of aluminum as a reactive infiltrant (3:33-37) and reactively infiltrating the aluminum into the titanium oxide mass to produce a composite comprising aluminum oxide and titanium metal (4:61-5:26) wherein the titanium metal diffuses from the composite (3:22-24).

**Claims 7 and 24:** Breslin teaches that, unlike prior art methods, an oxidizing atmosphere is not required in this process (5:63-6:4). Thus, Breslin implicitly teaches that it is known in the art of reactive infiltration to use an oxidizing atmosphere and, therefore, anticipates a method which uses an oxidizing atmosphere.

**Claims 13 and 25:** Breslin teaches that the infiltration is carried out at a temperature of about 1250°C (4:44-55).

### *Claim Rejections - 35 USC § 103*

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 9 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Breslin.

**Claim 9:** While Breslin does not expressly teach the inclusion of titanium aluminide, Breslin teaches that the composite includes an alloy comprising at least two or more metals including titanium and aluminum (claim 14). Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have selected titanium aluminide as the alloy fitting this description in the method of Breslin with the predictable expectation of success.

**Claim 26:** Breslin fails to expressly teach that the temperature is greater than about 1850°C. However, Breslin states that the growth rate of the ceramic is dependant on the temperature and that higher growth rates lead to an increase in growth rate (4:44-55). “[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.” *In re Aller*, 105 USPQ 233, 235 (CCPA 1955). Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have selected a temperature of at least about 1850°C in the process of Breslin with the predictable expectation of successfully increasing the growth rate of the composite ceramic.

6. Claims 5, 10, 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Breslin in light of Newkirk et al. (US 5,329,984).

**Claims 5, 10, 14 and 15:** Breslin further teaches that the metal matrix comprises particles of titanium oxide (2:65-68) and that the matrix can be prepared in any desired shape and size (5:47-50). Breslin, however, fails to expressly teach that the matrix is in the form of a loose bed of particles. Newkirk, however, teaches a method of infiltrating a ceramic matrix with molten aluminum to form a ceramic composite (1:31-55). Newkirk further explains that the ceramic matrix can be provided as either a preform or a loose bed of particles (see, e.g., 15:5-12). Thus, because Breslin teaches that the matrix can be provided in as particles in any desired shape and because Newkirk teaches that a loose bed is a suitable shape to use in place of a preform, it would have been obvious to one of ordinary skill in the art at

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the time the invention was made to have used a loose bed of particles in the method of Breslin with the predictable expectation of success.

Breslin also fails to teach that the particles are coated with magnesium nitride. Newkirk teaches that coating the ceramic particles with magnesium nitride prior to infiltrating the matrix with aluminum improves the compatibility of the ceramic matrix with the molten aluminum (14:30-62). Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have coated the ceramic particles of Breslin with magnesium nitride, as taught by Newkirk, in order to have improved the compatibility of the ceramic matrix with the molten aluminum.

7. Claims 16-18 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Breslin and Newkirk in light of Bomberger (US 3,619,184).

**Claims 16-18 and 20:** Breslin fails to teach that the titanium is stabilized with at least one alpha and/or beta stabilizer. However, Bomberger teaches that is known in the art to utilize alpha (see, e.g., 1:24-36; 2:1-45) and beta (see, e.g., 2:1-45, 5:13-26) stabilizers, such as vanadium (Abst., 2:1-45) to stabilize titanium (Abst.) in order to improve the strength of the titanium (1:3-13). Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have included alpha and/or beta stabilizers such as vanadium in the method of Breslin in order to produce titanium with superior strength properties.

8. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Breslin in light of Bomberger for the reasons given above with respect to claim 20.

9. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Breslin, Newkirk and Bomberger in light of Woditsch et al. (US 4,179,306).

**Claim 19:** Bomberger teaches that vanadium is a suitable stabilizer for titanium, but fails to teach that it can be introduced as vanadium oxide. However, Woditsch teaches that vanadium oxide can be used to stabilize titanium (see, e.g., 1:5-18). The selection of a known material based on its suitability for its intended use supported a prima facie obviousness determination in *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945). Thus, it would have been obvious to one of

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ordinary skill in the art at the time the invention was made to have used vanadium oxide to stabilize the titanium in the method of Breslin/Newkirk/Bomberger with the predictable expectation of success.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ROBERT VETERE whose telephone number is (571)270-1864. The examiner can normally be reached on Mon-Fri 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Cleveland can be reached on 571-272-1418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Robert Vetere/  
Examiner, Art Unit 1712

/Michael Cleveland/

Supervisory Patent Examiner, Art Unit 1712